BLADDER NEOPLASMS, WITH A BRIEF SERIES

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IN considering malignant growths of the bladder we find a great diversity of opinion both as to the pathology and methods of treatment. There are many classifications of these growths, and many ways of dealing with the subject. Some authors depend entirely on the microscopical findings while others are guided mainly by the clinical picture. The great difficulty in the diagnosis by microscope is the transitional type of cell, and the manner of growth. How often in every service do we find the laboratory report "papilloma undergoing malignant change." Oertel contends it is almost impossible to distinguish between a diffusely growing carcinoma and a sarcoma in the bladder. But the difficulties are not confined to the microscope. The clinical diagnosis has also its problems.

In 1922 Lower reviewed so thoroughly the classifications of Buerger, Geraghty, Judd and Harrington, Barringer, and the end results of Gardner, Thomas, Scholl, etc., and also added so excellent a series of 222 cases of his own that it is unnecessary for me to go into details of previous experience and conclusions.

The majority of primary tumours of the bladder are of course the papillary fibroadenomata, and the papillary villous cancers. Besides these, squamous celled cancers with epidermisation, the cylindrical cell cancers, are at times noted. Of other tumours, fibromyomata, sometimes with other connective tissue additions, and large, sometimes papillary, nodular, sarcomatous myomata of either smooth or striated muscles occur. Much rarer are the ordinary small, round-celled, sarcomata, spindle-cell sarcomata, and, very rarely, lymphosarcomata and osteosarcomata.

In the histogenetic classification of the tumours according to the type of their parent soil, a distinction is made in the first place between epithelial and non-epithelial tumours. The latter are naturally derived from the deeper layers of the vesical wall, the muscular or the submucosa. Among the benign mature forms, myomas, leiomyomas, and fibromyomas are met with, and pure fibromas may also occur. These tumours are usually small, spherical and easily enucleated. They acquire a greater interest when the shape of their cells, and, often at the same time also, the type of their growth, undergo a change. In this manner, large, nodular, fibrosarcomas and myosarcomas, consisting of immature anaplastic cells, may originate. Pure sarcomas are rare.

The tendency of the bladder to the formation of mixed tumours is shown by such malignant tumours being often mixed with various other tissue types; genuine teratomatous mixed tumours have also been observed. There are osteoid chondrosarcomas, rhabdomyosarcomas sometimes with cartilaginous insertions, adenofibrosarcomas, and so forth. Furthermore, there are angiomas, carcinomas, and lymphangic endotheliomas.

The most important groups of bladder tumours are the epithelial tumours. These are derived in part from the epithelial nests or from aberrant prostatic germs, adenofibromas and adenomas, or they are developed from the surface epithelium. These tumours are the proliferations generally known under the name of papillomas, and papillary carcinomas. In the interest of accurate nomenclature, these tumours should be designated not as papillomas but as papillary epitheliomas or fibro-epitheliomas, and as papillary carcinomas, for any tumour can be papillary, including sarcoma, whereas the decisive point for the designation is the histological composition of the tumours, and this is fibro-epithelial in character.

Probably a larger number of bladder cancers than supposed are extensions from the prostate. Kaufmann states that out of twenty-seven prostatic cancers, eighteen had extended to the bladder, and with preference for the posterior wall. This has recently been brought quite forcibly to our attention in three operative cases, and in two not operated upon. The growths in the bladder are commonly knob-shaped, nodes and plates, covered with relatively normal mucosa or with slight sloughing. They often re-

semble clinically a strawberry myoma, and have slightly the appearance of the aged canned strawberry. Some surgeons believe that many so-called primary bladder tumours are in reality prostatic cancers. The fact that a prostatic cancer may occur in a grossly not enlarged prostate makes this not improbable, even in cases where the prostate is apparently grossly unchanged.

The epithelial tumours of the bladder are often divided into benign papillomas and malignant papillomas. Perhaps the commonest suggestive clinical signs of malignancy in these growths are:

(1) Induration.
(2) Slough.
(3) Resistance to fulguration.
(4) Single tumour-multiplicity very often means benign tumour.
(5) Age of patient—those in older patients are more probably malignant.

Geraghty classifies these tumours as:

Tumours of epithelial origin: (Papilloma, adenoma, benign malignant); (cysts, carcinoma, papillary, squamous, adeno-).

Tumours of connective tissue origin: Sarcoma, myxoma, fibromyoma, angioma.

Tumours of muscular origin: Myoma.

Heterotopic: Rhabdomyoma, hydatid cysts, dermoid cysts, chondroma.

Buerger divided them still farther into:

(1) Papilloma.
(2) Infiltrating papilloma.
(3) Papilloma with carcinomatous change.
(4) Primary papillary carcinoma:
    a. Papillary polypoid type.
    b. Secondarily infiltrating type.
(5) Primary squamous-celled carcinoma:
    a. Infiltrating type from papilloma.
    b. Squamous type from papillary tumours.
    c. Secondarily prostatic tumour, metastasis from without.

In the main these classifications are the same. Personally I like the general plan of Christeller, and divide these growths as follows:

(1) *Typical Papillary Fibroepitheliomas (benign).*—Their most important sign is that the epithelial proliferations remain restricted to the mucosa, and are thus directed only towards the interior of the bladder. There is no tendency to grow into the deeper tissues, and these tumours are therefore displaceable on their base.

(2) *Typical Papillary Fibroepitheliomas (malignant).*—These tumours although presenting certain histological irregularities, in the pigment and basement membrane, are without the most important signs of malignancy, in the form of destructive growth, they penetrate nowhere into the submucosa or muscularis, and do not give rise to metastases. They are often reported as benign undergoing malignant change.

(3) *Papillary Carcinoma.*—Characterized by a destructive deep growth into the muscular layer. The superficially papillary structure closely resembling fibroepithelium is deeply alveolar, as in all other carcinomas. The histological diagnostic examination fully reveals the existence of typical cancer cells and destructive growth in the second and third stage, so that the diagnosis of malignancy can be positively rendered. The diagnosis of benignity in these cases affords information only of the segment of the tumours examined, and not of the growth as a whole.

(4) Aside from papillary cancers, *solid cancers* also occur in the bladder, being histologically in part solid cellular medullary cancers, in part scirrhous or alveolar types.

In the literature of the subject the inoperability of a large proportion of cases of bladder tumours is rightly attributed to the length of time which elapses between the first symptom and the operation. The cystoscope has made the diagnosis of the presence of bladder tumours so easy that there is absolutely no excuse for the long histories with no treatment which we find in those cases. The history of our own cases varied from two weeks to thirty years. It is not the absence of symptoms that causes havoc, but it is rather the failure to appreciate the importance of early symptoms. Blood in the urine is never physiological; it is a symptom of some pathological condition, and it demands instant investigation. An analysis of 821 hæmaturies in our clinic showed that 192 were due to calculi, 113 to tumours, eighty-eight to renal tuberculosis, and 143 to surgical infections of the ureters and kidneys, or, excluding the urethra, 536 cases out of 761, that is over seventy per cent. were caused by calculi, tuberculosis, cancer, or surgical lesions of the kidney; while the other thirty per cent. most certainly required investigation. The

great importance of subjecting these patients to a careful and thorough examination is at once apparent.

With the cystoscope in the bladder, unless the bleeding is profuse, the growth within the bladder can easily be detected, and the surgeon can frequently tell whether the tumour is benign or malignant from the cystoscopic picture.

The benign tumours are delicate, floating, warty growths of pale pink colour, the vessels in the fronds often being visible. The different branches of the tumours float about in the irrigating fluid and the neighbouring mucous membrane of the bladder looks absolutely normal.

On the other hand malignant papillary growths are often single, there may be necrosis of the masses, or they may be partially covered with exudate, the fronds are more or less united presenting the appearance of a mixed papillary and solid growth, and the adjacent mucous membrane of the bladder is often œdematous and rugated—so-called bullous œdema. Again, benign tumours melt away under fulguration treatment, whereas the malignant ones are much more obstinate. Vaginal or rectal examination, which should regularly be made in all doubtful cases, often will detect the increased resistance of the infiltration of a malignant growth of the base of the bladder.

There is also another cause for diversity of results in the treatment of these growths. A tumour in the vault of the bladder is altogether a different proposition from a growth surrounding the vesical neck, regardless of what type of treatment is used.

In our own small series of cases, we do not attempt to advance anything new in diagnosis or definite in treatment but only to add our results to those of others.

Our list includes:

Total number of cases	228
Total benign, microscopically and clinically	110
Number microscopically malignant	85
Number clinically malignant (not microscopically confirmed)	33
Total malignant tumours	118
Males	93
Females	25

	Total	*Males*	*Females*
Papilloma, malignant, clinically	30	23	7
Papilloma, malignant microscopically	9	8	1
Papillary carcinomas	70	60	10
Carcinomas, medullary, etc.	8	5	3
Sarcoma, mixed growth	1	1	0

	Age	
Papilloma:	*Youngest*	*Oldest*
Males	33	71
Females	26	62
Carcinoma:		
Males	30	88
Females	23	71
Sarcoma:		
Male	31	

The pulse, temperature and respiration curve in uncomplicated cases, is no aid to diagnosis, showing no constant variation.

Complaints according to frequency and order of occurrence:

Hæmaturia.—Chief complaint in 75 per cent. of cases, and usually the cause for seeking relief.

Frequency.—Chief complaint in 25 per cent. associated in 40 per cent to 60 per cent.

Dysuria.—Chief complaint in 10 per cent. of cases associated in 15 to 20 per cent.

Associated Complications.—Pain in loin; incontinence; pain in perineum and genitalia. Suprapubic pain not common.

Relief was sought by the patients any time from two weeks to thirty years after the onset. If there was copious initial hæmaturia, aid was sought immediately. The longer cases, in many instances, proved to be papillomata, which had undergone malignant changes.

In the early stages carcinoma is a local disease. The rational treatment, theoretically at least, is complete and radical excision. In the bladder the disease often remains local for a long period, and does not metastasize readily. Every effort, therefore, should be made to bring these patients for examination early, that we may get rid of the local involvement before it becomes a general condition.

As a great many cases occur in the sixth, seventh, and eighth decade, the history and clinical picture are often combined and associated with signs and symptoms of prostatism. As many of those cases give a history of several years, the age curve does not represent the true curve for the beginning of the bladder tumours.

It would appear that the gastro-intestinal manifestations of bladder tumours, as compared with renal lesions, are comparatively few.

Some individuals complained of constipation, this usually proved to be an anatomical effect. Symptoms of hypersecretion (gas eructations, hyperacidity, and the like) are not the rule, while it is interesting to note that in nitrogen retention, due to conditions of and within the bladder, the urea nitrogen may go to three to

four times normal; the creatinine remaining stable and fixed. The gastro-intestinal symptoms in these instances are few.

Loss of weight and strength are marked only in the advanced cases; while the blood pressure findings vary greatly, being low, frequently, in the advanced carcinomata.

Physical Examination of the Genito-Urinary Tract.—The ordinary examination discloses little that is diagnostic. Abdominal examination may be said to be negative. Occasionally there is suprapubic tenderness, usually present when there is an associated acute cystitis.

Rectal examination in the case of papilloma of the bladder is practically always negative. In the case of carcinoma of the bladder, the infiltration of the wall may cause the mass to be palpable, while nodules in and about the prostate may be significant.

The urinary findings are as one might expect; there is often macroscopic blood; the specific gravity usually shows good variation; associated nephritis, as evidenced by casts is not marked; albumin is present from a slight trace to a considerable degree; sugar was found in only one case in the series, it being a true glycosuria. Microscopical examination shows pus and red blood cells in varying degrees. In rare cases, pieces of tissue were passed in the urine, and were of diagnostic value. The phenolsulphonephthalein estimations are usually below normal but, as in cases of the blood chemistry figures, this condition improves, following the establishment of free drainage.

Sufficient blood findings are not available to be of value but in several cases of carcinoma there was a slight leucocytosis. There is usually a varying secondary anæmia. In addition to the above there may be the usual derangement of the various systems. Only in one case was there a positive Wassermann.

Cystoscopic Examinations.—The findings on cystoscopic examination usually enable one to make a diagnosis. Occasionally a chronic inflammatory condition which has undergone degenerative or productive change, or extensive bullous œdema, will confuse or complicate the diagnosis.

TREATMENT

Papilloma of bladder, malignant		39
Repeated fulguration		19
Cured	12	
Improved	7	
Cystotomy and cautery		6
Cured	5	
Improved	1	
Excision		6
Cured	4	
Improved	2	
Cautery and radium		5
Cured	4	
Improved	1	
Not treated		3
Carcinoma		78
Inoperable, not treated		27
Excision		14
Cured	7	
Recurrence	6	
Died	1	
Excision and cautery		3
Cured	2	
Recurrence	1	
Excision and radium		4
Cured	2	
Recurrence	2	
Cautery and radium		6
Cured	4	
Recurrence	1	
Died	1	
Excision and transplantation of ureter		
Cured	1	
Excision and transplantation of ureter, and radium		
Died	1	
(From metastases 5 months later)		
Cautery and fulguration being only palliative efforts in advanced cases		11
Cured	1	
Recurrence	4	
Not improved	5	
Died	1	
Deep x-ray of inoperable cases		6
Improved	2	
Not improved	3	
Died	1	
Suprapubic drainage for advanced inoperable conditions		5
Not improved	1	
Died	4	

The mortality includes death within three months of discharge. So-called cures were all followed for six months to seven years, generally from one to three years.

In the treatment by high frequency currents the bipolar method was used altogether; the response in some papillomas to fulguration is very striking. I do not believe the high frequency is of any use in carcinomata except perhaps as a hæmostatic, nor have I found it satisfactory in extensive tumours at the vesical neck, mainly

on account of the difficulty of control in this area.

In cases of very extensive papillomatosis of the bladder the cautery through a suprapubic incision gives more satisfactory results. In removing these growths by the suprapubic route the operator must remember the property of epithelial cells to grow on denuded surfaces. Therefore, we must develop a method which prevents implants; we must destroy the tumour *in situ,* sponge as little as possible, and protect the prevesical space and the wound in the abdominal wall, so that no accidental implants may result.

In the surgical technique for the removal of bladder tumours, we have used for a number of years the method of approach favoured by Beer, Squier, and others, namely the extraperitoneal liberation of the bladder permitting the drawing of the organ well out of its peritoneal and perivesical coverings, so that when the bladder is opened it is about two-thirds out of the abdomen.

Briefly the technique is as follows:—The bladder is irrigated gently with warm boric or salt solution and the patient is put in Trendelenberg position. A free median suprapubic incision is made down to the bladder, which is not opened at present. The peritoneal fold is carefully separated, the urachus is liberated, clamped, cut and the upper stump ligated. The lower stump is used to draw the bladder towards the symphysis while the operator separates the peritoneum from the posterior wall of the bladder. The bladder is now well through the wound, and the abdominal wound is now well protected with gauze. The bladder is then opened almost anywhere, depending on the location of the growth or growths, and with the electric cautery the tumours are destroyed *in situ,* with as little manipulation and sponging as possible. If the case is one of benign papillomatosis complete destruction with the cautery well into the bladder wall is sufficient. If, however, the cystoscopic and microscopic examination, and the palpation at the operation suggests malignancy, the underlying bladder wall must be widely excised. If the tumour involves a ureteral orifice it is best to excise the tumour and about 2 cm. of ureter. The ureter is reanastomosed with the bladder by puncturing a healthy part of the bladder wall and drawing the ureter through for about 1 cm. after splitting it into two lips and attaching it by catgut suture to the bladder.

The incision in the bladder wall, and in extension cases, the inside of the bladder, is swabbed with carbolic and the wound and bladder filled with alcohol for three minutes, with the object of coagulating any viable tumour cells which may be about. The table is now returned to a horizontal position and the wound closed with a suprapubic tube to the bladder, and an extravesical cigarette drain is placed along the operation incision in the bladder and through suprapubic wound.

In the radium treatment emanation seeds were used, and inserted through a hollow needle.

When deep x-ray treatments were given, they consisted of a series of four treatments of 200 kilovolts, five milliamperes, sixteen inches distant, and exposure for sixty minutes. The rays are filtered through one millimetre of copper, and one millimetre of aluminium. One exposure is given over the symphysis, one over the sacrum, and one over the right and left sacro-iliac joints. This is repeated at the end of six weeks.

In conclusion, our experience has taught us that certain considerations must be emphasized with care in the attempt to solve this grave problem. The importance of recognition of blood in the urine cannot be overestimated; the examination of the prostate is of equal necessity; the age and development of the growth must be carefully decided; the location of the growth must be definitely settled; freer and more open surgical methods, even in cases of recurrence, must be followed; and finally a more thorough and reliable follow-up system, extending over the remainder of the patient's life must be adopted. If these considerations and theories are followed with careful practice, our experience convinces us that the ravages of bladder cancer will greatly diminish.

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